

R E M A R K S

Claims 2-21 are now in this Application, and are presented for the Examiner's consideration.

Prior Art Rejections

Claims 1, 5, 6, 9, 10, 16, 18 and 21 were rejected under 35 U.S.C. §103(a) as being obvious from U.S. Patent No. 3,887,155 to Bertalot in view of U.S. Patent No. 3,757,601 to Burke.

As stated in the previously filed Amendment, Bertalot does not disclose hollow elasticity bodies. It is even doubted that the rollers 18 and 20 are hollow at all. Bertalot describes that the rollers are held for free rotation in a frame. See column 2, lines 30 to 35. The circular structure which can be seen at the front of the rollers (Fig. 4) is probably just a depression serving to hold the rollers in the frame.

This is because Bertalot is not related to transmitting an torque from turning of elements 1, 2 or 3 to another element, but is only concerned with axial movement. Specifically, Bertalot is directed to "a telescoping support mechanism ... suitable for supporting operating-room lamps, radiation sources and other instruments which require accurate non-changing displaceability without backlash." This is very different from a turning steering column in which one element must transmit turning torque to the other element, and in addition, be slidable in the axial

direction in order to raise and lower the steering wheel attached to one of the elements.

As for the elasticity, Bertalot describes the use of cup springs 27 and 28 to urge races 25 and 26, on which the rollers 18 and 20 run, to the intermediate section 2. See column 2, lines 43 to 48, and Fig. 3. A similar construction connects the intermediate section 2 to the inner section 3. See column 2, line 65 to column 3, line 3. The pressure of the cup springs contributes to maintaining the section 2 in a backlash-free connection to the section 1. See column 2, lines 50 to 52, and the same applies to the connection of the section 2 to the section 3. The cup springs are needed, just because the rollers 18 and 20 are not elastic.

Further, in view of the operation of Bertalot, there is no suggestion in Bertalot for making the rollers 18, 20 elastic, and furthermore, there would be no logical reason to do so. This is because the rollers 18, 20 are provided only for aiding in movement of the elements 1, 2 and 3 in a single direction, namely, the axial direction.

The Examiner admits that Bertalot fails to disclose that the roll barrels are elastically deformable. See lines 8-9 of paragraph number 2 on page 2 of the Office Action.

In contrast, the present invention features roll barrels constructed as hollow elasticity bodies. Because they are

elastically deformable, the roll barrels themselves adapt to the clearance between the flattening of the internal element and the flattening of the external element. The extra resilient means or cup springs of Bertalot can be dispensed with.

Further, Bertalot fails to disclose a telescopic mechanism which serves as a steering column for transmitting a steering torque. With the present invention, a) the elements 10 and 14 move in the axial direction relative to each other to adjust the height of the steering column, and in addition, b) the rollers transmit a steering torque between the internal element and the external element in order to steer the wheels. Although the elements 1, 2 and 3 of Bertalot move in the axial direction, as with a) above, there is no transmission of any turning torque, and in fact, this would be contrary to the invention of Bertalot. For this reason, there would be no logical reason to make the rollers 18, 20 of Bertalot resilient.

On the other hand, Burke teaches a telescopic steering column with hollow elastic bodies 84 intervening between the internal and external elements. The Examiner equates these elastic bodies 84 with the presently claimed roll barrels. However, these bodies 84 can by no means be regarded as the claimed roll barrels. As shown in Fig. 4 of Burke, bodies 84 are accommodated in semi-circular seats of the internal and external members, and they are arranged in the axial direction of the

steering column. Thus, bodies 84 can not roll and must not roll when the internal and external elements of the steering column are moved telescopically.

It is considered to be a new and inventive concept in the present invention that the roll barrels are constructed as hollow elasticity bodies that are oriented transverse to the axial direction of the internal and external elements, so that they perform no less than three distinct functions, as follows:

1. They form roller bearings for the telescopic movement of a steering column in the axial direction.
2. They form elastic elements for removing the gap between the internal and external elements of the steering column.
3. They serve as torque transmitting elements which transmit the torque from the internal element to the external element of the steering column (or vice versa) when the steering wheel is turned, that is, in a direction at right angles to the axial direction.

When transmitting a steering torque in this way, it should be noted that the roll barrels (hollow elasticity bodies) will experience a compressing force and will be elastically deformed only in one of their opposite end portions (page 2, lines 19-22

of the present application). For example, when the internal element 10 of the steering column shown in Fig. 1 of the present application is turned clockwise, the vertically extending roll barrel on the right side of the figure will experience a compressing force only in the top portion, but not in its bottom portion.

In comparison, when the steering column disclosed by Burke is rotated, the elastic bodies 84 will experience a compressive force evenly distributed over their whole length, because they are arranged in the longitudinal direction of the steering column.

In addition, the elastic bodies 84 of Burke are formed as hollow cylindrical spring pins that are made elastic by a lengthwise gap 85 therein which tends to expand the outside diameter of the spring pin beyond its smallest value. The spring pins 84 are fixed relative to the internal element by the abutments 83 and frictionally rides on the inner friction surface 81 of the external element. See column 3, lines 23-42. The reason for the resilience by the gap 85 is only to cause the key portion of each spring member 84 to firmly seat in the seat portion 82 while generating substantial forces between the friction surface of the pin and friction surface 81 of the external element. This provides for unitary rotation of the internal and external elements. See column 3, lines 43-63.

Therefore, the resilience is related only to holding the spring pins 84 firmly in place and has no relation to transmission of any torque between the inner and outer elements. In fact, it serves to keep the inner and outer elements axially fixed relative to each other, until a sufficient force is provided to overcome the friction with friction surface 81. See column 3, lines 53-63. This would be contrary to the teachings of Bertalot in which axial movement is a necessity and the roll bodies 18, 20 thereof aid in the axial movement, rather than hinder axial movement as in Burke.

It is submitted that a person of ordinary skill in the art, considering the patent to Burke, would not have thought of arranging the hollow cylindrical bodies 84 at right angles to the axis of the steering column, in order to use them as roll barrels of a roller bearing for the telescopic movement of the steering column. This would be contrary to the teachings of Burke and would render Burke inoperable for its intended purpose. Conversely, a person considering the telescoping support mechanism disclosed by Bertalot would not have thought of using this support mechanism as a telescopic steering column, so that the roll barrels must be involved in transmitting a steering torque, and would in any case not have thought of making these roll barrels hollow and elastically deformable.

As discussed above, since Bertalot is only concerned with axial movement of the elements 1, 2 and 3, and there is no turning movement at all, there would be no logical reason to make the roll elements 18, 20 thereof deformable. Burke does not provide this suggestion, since Burke is concerned with a turning mechanism, contrary to Bertalot, and also, the roll elements of Burke are oriented a right angles to those in Bertalot, since Burke uses the spring pins 84, not as roll elements, but as friction elements.

Further, the Examiner states numerous times that the purpose of the roll bodies is to always cover the gap between the internal element and the external element due to their natural resiliency. See page 2, last two lines; and page 4, lines 11-13 of the Office Action. However, as discussed above, another important consideration is the fact that they are used to transmit torque due to the turning of the steering wheel.

In order to better define the present invention, claim 1 has been canceled, and the all dependent claims depend from claim 21.

Claim 21 has been amended in a clarifying nature only. Specifically, claim 21 recites in the preamble a "telescopic mechanism for steering columns of motor vehicles." Since a steering column, by definition, means that there must be a turning motion, and not just an axial motion, claim 21 further defines this in general terms consistent with the preamble, to

recite that the roll barrels "transmit a steering torque between the internal element and the external element." First, it is submitted that this is a clarification of the preamble, and second, is an inherent function of the mechanism, as claimed. Thus, no new issues are presented.

Accordingly, it is respectfully submitted that the rejection of claims 1, 5, 6, 9, 10, 16, 18 and 21 under 35 U.S.C. §103(a), has been overcome.

Claims 1-4, 14, 15, 17 and 19 were rejected under 35 U.S.C. §103(a) as being obvious from Bertalot in view of British Patent No. GB 530,342.

The remarks made above in regard to Bertalot are incorporated herein.

Since this rejection was not made as to claim 21, and since claim 21 is the only independent claim now in the application, with all other claims depending therefrom, it is submitted that this rejection has been overcome.

GB 530,342 discloses neither a steering column nor a telescopic mechanism. It only discloses roll barrels formed as hollow elasticity bodies. However, these roll barrels are arranged longitudinally of the cylindrical internal and external elements to form the roll barrels of a radial bearing. Thus, they are oriented in the same direction as in Burke. They are



not involved in transmitting any torque from the internal element to the external element, and when they are compressed due to radial forces acting on the internal element, they will be compressed on their whole length, similarly as in the patent to Burke. As discussed above, when a transmitting torque is generated, one end of the roll barrels is compressed to a greater extent than the other to facilitate this operation. This is because of the orientation of the roll barrels in an orthogonal direction to those in GB 530,342.

Since Bertalot fails to disclose the feature that the roll barrels are involved in transmitting a steering torque, as is necessary in a steering column, and since GB 530,342 also fails to disclose this feature, it is submitted that even a combination of the two references could not render the present claimed invention obvious.

As discussed above, since Bertalot is only concerned with axial movement of the elements 1, 2 and 3, and there is no turning movement at all, there would be no logical reason to make the roll elements 18, 20 thereof deformable. GB 530,342 does not provide this suggestion, since GB 530,342 is only concerned with a turning mechanism, contrary to only the telescoping motion of Bertalot, and also, the roll elements of GB 530,342 are oriented at right angles to those in Bertalot, since GB 530,342 uses the

roll barrels as bearing type elements between two relatively rotatable elements.

When combining the British patent with Bertalot, it must be noted, in both cases, the cylindrical elastic bodies of the British patent are arranged longitudinally of the internal element, and there was not even a remote suggestion or hint for a person of ordinary skill in the art to arrange them orthogonally to the axis of the steering column so as to use them as roll barrels for the telescopic movement of the steering column.

Thus, there is no suggestion or any logical reason for combining Bertalot with the British patent, since the roll barrels of each are oriented at right angles to each other and aid in completely different operations.

Accordingly, it is respectfully submitted that the rejection of claims 1-4, 14, 15, 17 and 19 under 35 U.S.C. §103(a), has been overcome.

Claims 7, 8, 13 and 20 were rejected under 35 U.S.C. §103(a) as being obvious from Bertalot in view of Burke and U.S. Patent No. 1,617,613 to Wells.

The remarks made above in regard to Bertalot and Burke are incorporated herein.

Since this rejection was not made as to claim 21, and since claim 21 is the only independent claim now in the application, with all other claims depending therefrom, it is submitted that this rejection has been overcome.

Wells was merely cited for disclosing a cylinder 20 made from a rolled up blank. Wells is directed to a roller bearing, and there is no disclosure or even a remote suggestion of hollow elastic roller bodies oriented transversely between inner and outer elements, that is transverse to the lengthwise direction for aiding in both telescoping motion and torque transfer upon turning.

Accordingly, it is respectfully submitted that the rejection of claims 7, 8, 13 and 20 under 35 U.S.C. §103(a), has been overcome.

Claims 11 and 12 were rejected under 35 U.S.C. §103(a) as being obvious from Bertalot in view of Burke and U.S. Patent No. 5,345,679 to Lennon et al.

The remarks made above in regard to Bertalot and Burke are incorporated herein.

Since this rejection was not made as to claim 21, and since claim 21 is the only independent claim now in the application, with all other claims depending therefrom, it is submitted that this rejection has been overcome.

Lennon et al was cited for flexible cross members. However, Lennon et al uses balls 32 rather than cylindrical roll bodies, and therefore fails to cure the aforementioned deficiencies of Bertalot and Burke.

Accordingly, it is respectfully submitted that the rejection of claims 11 and 12 under 35 U.S.C. §103(a), has been overcome.

If the Examiner has any comments, questions, objections or recommendations, the Examiner is invited to telephone the undersigned at the telephone number given below for prompt action.

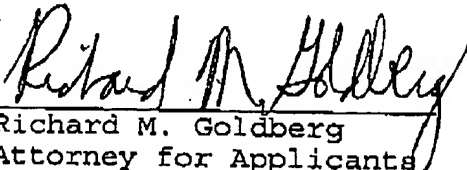
In the event that this Paper is late filed, and the necessary petition for extension of time is not filed concurrently herewith, please consider this as a Petition for the requisite extension of time, and to the extent not tendered by check attached hereto, authorization to charge the extension fee, or any other fee required in connection with this Paper, to Account No. 07-1524.

The Commissioner is authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 07-1524.

In view of the foregoing amendments and remarks, it is

respectfully submitted that Claims 2-21 are allowable, and early and favorable consideration thereof is solicited.

Respectfully submitted,

  
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